Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An acoustic transducer for measuring a property of a fluid, the acoustic transducer comprising:

an acoustic pulse generator;

an impedance matching layer between the pulse generator and the fluid, the matching layer being formed of a low thermal conductivity material, the impedance matching layer having reduced length to the point where traveling waves are no longer present; and

a thermal management system mounted to the matching layer to transfer heat from the matching layer, wherein the thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

2. (Original) The acoustic transducer of claim 1 wherein the matching layer thermal conductivity is less than 15 W/(m·K).

3. (Original) The acoustic transducer of claim 1 wherein the matching layer thermal conductivity is less than 1 W/(m·K).

4. (Original) The acoustic transducer of claim 1 wherein the matching layer is made of foam silica.

5. (Original) The acoustic transducer of claim 1 wherein the matching layer is made of silica.

6. (Original) The acoustic transducer of claim 1 wherein the thermal management system thermal conductivity is at least 15 W/(m·K).

7. (Original) The acoustic transducer of claim 1 wherein the thermal management system thermal conductivity is at least 100 W/(m·K).

8. (Original) The acoustic transducer of claim 1 wherein the pulse generator is configured to operate at a particular frequency and wherein the matching layer has a thickness approximately equal to an odd multiple of the quarter wavelength of sound in the matching layer for the particular frequency of the pulse generator.

9. (Original) The acoustic transducer of claim 1 wherein the thermal management system includes a plurality of fins.

10. (Original) The acoustic transducer of claim 1 wherein the acoustic generator is a piezoceramic element for generating an ultrasonic pulse.

11. (Original) The acoustic transducer of claim 1 wherein the matching layer has a surface coating in contact with the fluid which is being measured.

12. (Original) The acoustic transducer of claim 1 wherein during operation at least a portion of the matching layer sides and the matching layer tip extend into the fluid which is being measured, and wherein the thermal management system is arranged to insulate the portion of the matching layer sides from heat from the fluid while leaving the tip of the matching layer in contact with the fluid.

13. (Original) The acoustic transducer of claim 12 wherein the insulated portion of the matching layer sides is insulated by an air gap formed by the thermal management system.

14. (Original) An acoustic transducer for measuring a property of a fluid, the acoustic transducer comprising:

an acoustic pulse generator;

an impedance matching layer between the pulse generator and the fluid, the matching layer being formed of a material with a thermal conductivity less than 1 W/(m·K); and

a thermal management system including a sleeve over the matching layer to transfer heat from the matching layer, wherein the thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

15. (Original) The acoustic transducer of claim 14 wherein the thermal management system thermal conductivity is at least 15 W/(m·K).

16. (Original) The acoustic transducer of claim 14 wherein the thermal management system thermal conductivity is at least 100 W/(m·K).

17. (Original) The acoustic transducer of claim 14 wherein the pulse generator is configured to operate at a particular frequency and wherein the matching layer has a thickness approximately equal to an odd multiple of the quarter wavelength of sound in the matching layer for the particular frequency of the pulse generator.

18. (Original) The acoustic transducer of claim 14 wherein the thermal management system includes a plurality of fins extending outwardly from the sleeve.

19. (Original) The acoustic transducer of claim 14 wherein the acoustic generator is a piezoceramic element for generating an ultrasonic pulse.

20. (Original) The acoustic transducer of claim 14 wherein the matching layer has a surface coating in contact with the fluid which is being measured.

21. (Original) The acoustic transducer of claim 14 wherein during operation at least a portion of the matching layer sides and the matching layer tip extend into the fluid which is being measured, and wherein the thermal management system is arranged to insulate the portion of the matching layer sides from heat from the fluid while leaving the tip of the matching layer in contact with the fluid.

22. (Original) The acoustic transducer of claim 21 wherein the insulated portion of the matching layer sides is insulated by an air gap formed by the thermal management system.

23. (Currently Amended) In combination with an apparatus including a conduit through which a fluid flows, the improvement comprising:

an acoustic transducer for measuring a property of a fluid, the acoustic transducer including an acoustic pulse generator, an impedance matching layer, and a thermal management system, the impedance matching layer being between the pulse generator and the fluid, the matching layer being formed of a low thermal conductivity material, the impedance matching layer having reduced length to the point where traveling waves are no longer present, and the thermal management system being mounted to the matching layer to transfer heat from the matching layer, wherein the thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

24. (Withdrawn) A sampling system comprising:

a fluid inlet for receiving a fluid;

a dilution inlet for receiving a dilution gas;

a mixing section for mixing at least a portion of the fluid with the dilution gas;

a collection section for collecting a sample of the mixture; and

a flow meter for measuring a flow related to the sampling system, the flow meter including an acoustic transducer for measuring the flow, the acoustic transducer

including an acoustic pulse generator, an impedance matching layer, and a thermal management system, the impedance matching layer being between the pulse generator and the fluid, the matching layer being formed of a low thermal conductivity material, and the thermal management system being mounted to the matching layer to transfer heat from the matching layer, wherein the thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

25. (Withdrawn) The sampling system of claim 24 wherein the flow meter includes a pair of acoustic transducers arranged in an opposed fashion in a conduit through which fluid flows for measuring the flow.

26. (Withdrawn) A sampling system comprising:

a sample line for sampling a fluid from a main conduit;

a flow meter for measuring a flow of the fluid through the main conduit, the flow meter including an acoustic transducer for measuring the flow, the acoustic transducer including an acoustic pulse generator, an impedance matching layer, and a thermal management system, the impedance matching layer being between the pulse generator and the fluid, the matching layer being formed of a low thermal conductivity material, and the thermal management system being mounted to the matching layer to transfer heat from the matching layer, wherein the thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator;

a dilution inlet for receiving a dilution gas;

a mixing section for mixing the fluid flow from the sample line with the dilution gas at a generally fixed ratio;

a collection section for sampling the mixture, the mixture being sampled at a rate generally proportional to the flow of the fluid through the main conduit

27. (Withdrawn) The sampling system of claim 24 wherein the flow meter includes a pair of acoustic transducers arranged in an opposed fashion in the main conduit.